국제학석사학위논문

Analysis on Latin American Participation in the Global Value Chain : The Role of Trade Agreements and a Focus on the Automotive Industry

라틴아메리카의 글로벌 가치사슬 분석 : 무역협정의 역할과 자동차산업 분석을 중심으로

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Analysis on Latin American Participation in the Global Value Chain : The Role of Trade Agreements and a Focus on the Automotive Industry

Thesis by

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Abstract

Analysis on Latin American Participation in the Global Value Chain :

The Role of Trade Agreements and a Focus on the Automotive Industry

Do trade agreements promote global value chains (GVCs)? If so, despite numerous regional trade agreements, why is Latin American participation in the GVCs not higher? What are some determinants that explain the low GVC participation in the region and what are the means to upgrade within the value chain?

Global Value Chains have become a central force driving structural change in many modern economies, with positive and negative outcomes. Participation in different segments of GVCs has profound and significant implications for participating countries. Although Latin American GVCs are heterogeneous, participation in a low value-added segment is a shared concern across the region.

This paper analyzes and evaluates the low GVC participation in Latin America over the past 17 years of 1995-2011, using OECD Trade in Value Added (TiVA). By building on the previous works on Latin American GVCs, this paper first analyzes the regional value chains of Latin America. The second section focuses on seven Latin American countries - Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, and Peru – and assesses the value-added content of exports and GVC participation for each. In addition, this paper also studies the different characteristics of Latin American GVCs in the manufacturing industry. By specifically looking at the TiVA of the automobile industry-, this paper argues that the lack of Latin American lead firms is one of the key challenges for the high-value added participation of Latin American countries in GVCs and that trade agreements should be focused on facilitating firms to upgrade within the value chain.

Keywords: global value chain (GVC), international trade, global production network, trade in value added, Latin America

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I. Introduction

"The cross-border flows of goods, investment, services, know-how and people associated with international production networks- call it 'supply chain trade' for short- has transformed the world." Richard Baldwin (Baldwin, 2012)

Since the 1980s, firms have faced a new paradigm in international business, whereby the production for a single good can be dispersed across many different countries. Such fragmentation of the production network has made businesses forge new partnerships with suppliers - sometimes even with their competitors. Firms have competed, but also have cooperated, in order to expand their market capabilities. This fragmentation of production networks is now commonly described as forming a "Global Value Chain" (GVC). This concept spans the entire process of production, from the initial conception of a product, to the acquisition of raw materials, and finally its delivery for consumption (Porter, 1986; Gereffi et al., 2001). Along this chain, multinational enterprises (MNEs) are the main actors, working alongside affiliates and independent suppliers from domestic and foreign markets (Gereffi et al., 2005). While these lead companies are the main players in GVCs, they partner with a wide variety of other firms during the process. Even though global suppliers have emerged as the key players in GVCs, there exists power relations and

knowledge flows depending on the particular type of GVC, which are important factors, addressed in further detail later in this paper.

The Organization for Economic Cooperation and Development (OECD) and the World Trade Organization (WTO) describe “value-added” as a way to understand “where economic activity and jobs are generated, not only internationally along the supply chains, but also domestically, as each exporting sector relies on intermediate inputs in goods and services purchased from other domestic suppliers” (OECD/WTO, 2012). By measuring the value-added, it is possible to understand where value is added, and by how much, through the production chain for both goods and services. Sometimes, value chains are called “regional” when lead firms pursue their production activities within a specific geographical region (Chang, Bayhaqi, and Yuhua, 2012). Technological improvements in transport and the decrease in communication costs and trade barriers have been branded the key drivers for the expansion of GVCs. For these reasons, it is easier for lead firms to expand regionally at first, as has been the case for the East Asian intra-regional GVC. Companies such as Toyota have extended their production networks from Japan to Thailand, dividing up the production process and relocating productive activities. Regional trade agreements (RTAs) have also played an important role in facilitating this process. Membership of Preferential Trade Agreements (PTAs) has been found

to correlate with an increase in investment and economic integration (Cadestin, Gourdon, and Kowalski, 2016), but there is marked variation between regions. While Asia and Europe seem to enjoy a link between RTAs and intra-regional GVCs, this does not seem to be the case for Latin American regional GVCs. According to recent OECD analysis, intra-regional GVCs in Latin America are particularly weak in contrast to other regions (Kowalski et al., 2015; Cadestin, et al., 2016).

The Latin America region is composed of Central and South America, plus Mexico. Many efforts have been made for economic integration within the region, with trade agreements dating back as early as the 1960s, such as the Latin American Free Trade Association (LAFTA), and the Central American Common Market (CACM). LAFTA was signed by the 10 independent countries of South America and Mexico, while CACM comprised the five Central American countries. According to OECD, in 2015 there had been 68 PTAs signed, 32 of which were intra-regional. However, despite these efforts, in terms of economic interconnectedness currently, the Latin American economic web is less tight than other regions. Some analysts put forward the argument that the region's heavy reliance on natural resources is a key factor. As much research suggests that GVC participation brings economic benefits such as productivity, diversification, and a sophistication of production - the facilitation

and promotion of GVC participation in the region becomes a crucial opportunity (OECD, 2013; OECD, 2015). This study aims to identify factors that hinder effective Latin American participation in intra-regional GVCs.

As mentioned earlier, proximity promotes GVC involvement, since shorter distance makes for lower transportation cots. This also leads to the use of infrastructure of each region to help the production network. Not only in the discourse of GVC, but also in terms of trade, it is agreed that free trade agreements (FTAs) also affect the ability of lead firms to add value in neighboring countries. Thus, protectionist trade laws and PTAs are also important factors for GVCs, since such agreements promote the barrier-free trade, which is conducive to global production networks. Based on these notions, it could be argued that regional GVCs are more evident and need to be encouraged. While that is not the case for Latin America, this paper aims to explore the characteristics of regional value chains in Latin America. The question began with the aim of finding the factors to explain the low GVC participation in the region and how this might be resolved. In addition to analyzing each country's trade in value added and their GVC participation, this paper also looks at the role of free trade and regional agreements for intra-regional GVCs. The GVC data used for this research comes from the OECD-WTO led Trade in Value Added (TiVA) database, and all seven countries in this

system from 1995-2011 will be studied. While Mexico is typically considered to be a part of North America, and Argentina, Brazil, Chile, Colombia, Costa Rica and Peru to be either Central or Southern America, for the purpose of this paper, all seven countries will be treated collectively as Latin American. With regional and country-level analysis, this paper specifically looks at the automotive industry, in which GVCs have prevailed since their early years. Mexican and Brazilian governments have enforced policies to promote this industry as their area of economic specialization. This paper compares the case of the Mexican automotive GVC with the Brazilian equivalent. On the back of the findings, this paper outlines its implications for future trade policies in Latin America.

This paper is organized as follows: Section II introduces previous studies on GVCs in Latin America, explains trade in value added, explores the relationship between RTAs and GVCs, and outlines what it means to upgrade within a value chain. Section III poses questions regarding the factors and characteristics of the regional analysis of Latin America, using the Trade in Value Added database of the OECD-WTO. The regional analysis looks at the decomposition of exports and imports in the region, and the partner dimensions of the value-added content of gross exports. With this research, it is possible to ascertain by how much Latin American countries are involved in the regional

GVCs, and whether value added is derived from either regional trade or trade from other regions. Section IV presents analysis of the Latin American countries listed in the TiVA database: Argentina, Brazil, Chile, Costa Rica, Colombia, Mexico and Peru. Again, the analysis of each country includes decomposing its exports and the share of GVC participation. Furthermore, this part will review each country's trade in value added. Finally, section V consists of the case study analysis of the automotive industry in Latin American GVCs. By analyzing the trade in value added of the automotive industry, this study finds whether Latin American value added accounts for foreign or intra-regional automotive industry. With these findings, this paper concludes by providing some conclusions and policy implications based on the case study analysis. It also touches upon the limitations of this present research.

II. Global Value Chain

1. GVC and Trade in Value added

GVCs are no longer a new phenomenon in economics and in business. For the last four decades, it has become harder to find products and services produced entirely in a single country. The increase in trade from final goods to intermediate goods is one of the most noticeable changes within GVCs. Trade in intermediates has surged, with Baldwin calling it the “second wave of global unbundling”. His theory relates to the separation of the site for the production of intermediates, and that of the production of the final products (Baldwin, 2006). It has become ever-more necessary to deduce which industries and countries add value to the country and industry of consumption. With the increasingly complex fragmentation of the production network, not all steps and activities add the same economic value in trade. The micro-evidence on GVCs has proven that the measurements differ between activities as each process and step is equivalent to different value added by providing different decomposition of value-added exports (Johnson and Noguera, 2010; Koopman, Wang, and Wei, 2011). The “traditional” trade statistic flow of goods is recorded in gross terms each time they cross a border, which leads to multiple-counting. Also, the final values accrue to the last country of assembly, which may be unrelated to the true origin of the value added. Due to the lack of these details, an alternative

dataset was needed to allow the decomposition of gross trade flows in the value-added components, as well as finding intra-firm trade and trade by enterprise.

Based on the Leontief model, the total output of an economy can be found as the sum of intermediate and final consumptions (Miller and Blair, 2009). Global value chains follow this concept as they challenge the traditional way trade and output statistics are measured. Trade statistics are recorded in gross terms, with the values of intermediate inputs traded along the value chain logged many times. As a result, the final producing country appears as capturing the cost of the value of goods and services traded, while the role of countries providing inputs upstream is overlooked. Thus the input-output approach was introduced to estimate the value added by each industry and each country in the process (De Backer and Miroudot, 2013). It added national input-output tables comparing it with the bilateral trade data. Based on the Inter-Country Input-Output (ICIO) data, it is possible to analyze the international trade flow of intermediate goods and services, origins of value added in domestic final demand, and harmonized bilateral trade positions.

With this system, in 2013, the OECD, in cooperation with the WTO, released TiVA statistics, with the aim of providing indicators to measure

international trade in terms of value added, better reflecting how international trade functions in practice. Simply put, the TiVA approach traces value added by each country and industry in the production chain and allocates the value-added to these source industries and countries. As of 2017, the TiVA database provides indicators for 63 economies across 34 industrial sectors, including manufacturing and services[1]. By using TiVA data, this paper explores 1) the decomposition of exports and imports, 2) the domestic value added content of gross exports and its partner dimensions, and lastly 3) the share of GVC participation for each country listed, and the region as a whole[2]. First, the purpose of the gross exports decomposition data is to assess the exports of the final and intermediate products and the domestic value added for these, by the exporter and partners alike. The gross exports figure includes the direct domestic value added, the indirect domestic value added, the imported (foreign) value added, and the re-imported domestic value added. This allows for a comparison between regions or countries of their involvement in exporting final goods and intermediate goods. With the domestic value added content of gross exports and foreign value added content of gross exports, it can be calculated in which industries more value added comes from the domestic contribution and

[1] All indicators are estimates, assumptions behind the ICIO model.

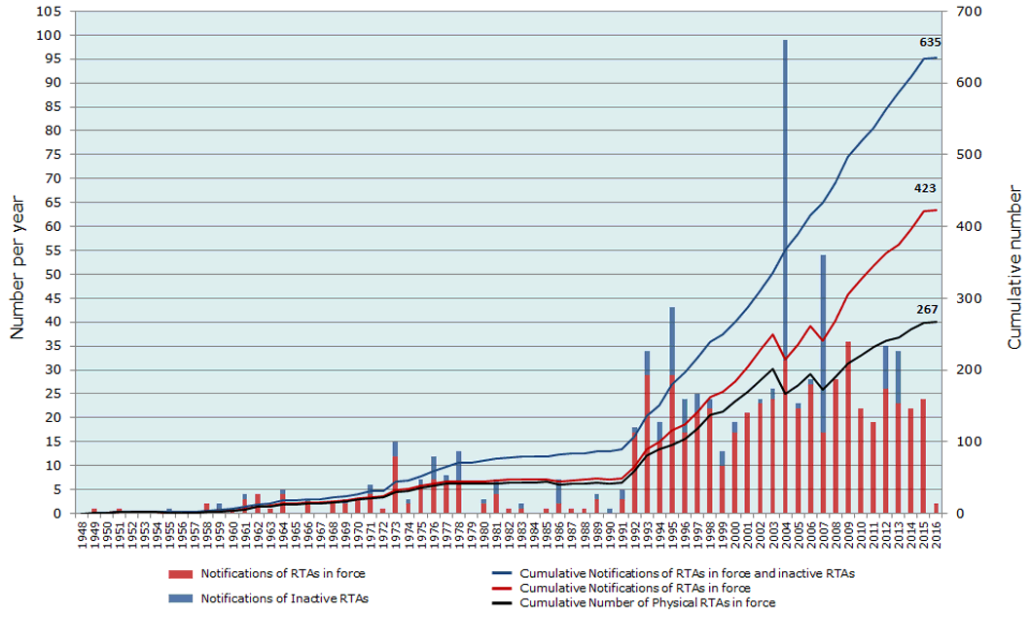
[2] The OECD-WTO TiVA database covers only seven Latin American countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, and Peru.

in which more value added is derived from abroad. Finally, GVC participation can be found from the "GVC participation index" proposed by Koopman et al. (2011). They provide the GVC participation for countries both as users of foreign inputs and suppliers of intermediate goods and services used in the exports of other countries. This index, according to De Backer and Miroudot (2013), can be given by the sum of two shares: 1) backward participation, i.e. the share of imported inputs out of all the exports of a given economy, and 2) forward participation, i.e. the share of exports of intermediates used by other economies to produce goods for their own exports. With these data, we can analyze their relation to other Latin American countries in terms of a production network, as well as by using a sectoral approach. Backward participation, where countries participate in the early stage of a value chain is often ranked low in terms of value added. According to TiVA, only two out of seven countries in Latin America have a higher share of backward participation than forward participation. In addition to this, regional participation share in general is lower compared to other regions. The GVC participation of Latin American countries will be discussed more in the latter part of this paper.

2. Regional GVC and Trade Agreements

As mentioned previously, the fruitfulness of a GVC proves the inter-twined economic activity of the region. Regional interconnectedness can be observed not only through regional GVCs but also RTAs, including bilateral FTAs. Ever since the establishment of the WTO in 2001, the number of trade agreements has increased and the coverage of these agreements has also been expanded and deepened significantly (Miroudot et al., 2013).

Figure 1. Number of RTAs in force



Source: WTO

Some studies have found a relationship between RTAs and GVCs focusing on the impact of integration and production networks, while others have found empirical evidence the way around (Miroudot, Rouzet, and Spinelli, 2013). Although there have been various arguments as to whether RTAs have facilitated GVCs or the converse, what is widely agreed is that the proliferation of RTAs and GVCs has occurred similarly (Cadestin, Gourdon, and Kowalski, 2016). After the financial crisis in 2008, global connectedness was impacted and has still not returned to the levels of robustness of the decade before. As a consequence, regional value chains have started to dominate (Brazinkas and Beinoravicius, 2013). A case study by Miroudot et al. (2013) provides evidence for the correlation between RTAs and GVCs. For the case of North America and Europe, RTAs cover the main intra-regional trade partners; but results vary for Asian countries. In the case of ASEAN countries, most economies tend to have RTAs with all their major GVC trade partners. However, for the larger economies - such as China, Japan and Korea – even though their GVC network is deep, there is currently no RTA between them. Nevertheless, compared to other regions, despite numerous RTAs, Latin American GVC participation is still considered to be lower and its intra-regional GVC weaker (Blyde, 2014; UNECLAC, 2014; and OECD, 2015). With studies suggesting that effective integration into GVCs is an important factor in raising productivity levels, it is

necessary to find ways to encourage further integration (OECD, 2013; OECD, 2015a and 2015b). This paper focuses on the possibilities of expanding regional value chains as the first step into, and effective integration within GVCs. Trade agreements have had clear benefits for firms in their expansion of production capabilities outside of domestic markets. However, while trade presents more possibilities for entry into and the upgrading of GVCs for developing countries, they also present challenges (Gereffi and Luo, 2014).

For the case of Latin America, efforts for RTAs have been evident since the 1960s. This region has a very dense connection of intra- and extra- regional PTAs. The most significant agreements were the signing of the Mercado Común del Sur (MERCOSUR) in 1991 and the North American Free Trade Agreement (NAFTA) in 1994. Out of a total of 68 PTAs in Latin America, 32 are intra-regional. Cadestin et al. (2016) find that while Latin America's extra-regional GVC is not as low as other regions, the intra-regional value chain is distinctly weak. This raises an important question as to the factors in which Latin American firms and governments are missing out on the opportunities that can be gained with their regional partners. Through individual country analysis and comparisons with regional PTAs, this paper will explore these factors in Latin America, as well as opportunities for improvement.

3. Upgrade in GVC

According to Gary Gereffi, “upgrading” within a GVC relates to the efforts of countries, regions, or other stakeholders to “maintain or improve their positions in the global economy” (Gereffi, 2011). The objective of upgrading is not to take control over entire segments of production - or indeed the entire value chain – but rather to find the best position for the country within the GVC. As mentioned previously, lead firms have been the main actors of GVCs. Although the increase of intermediate goods and global suppliers are becoming more important, lead firms continue to expand their power and increase their global market shares through mergers and acquisitions (Gereffi, 2014). Thus, the concept of “upgrading” is the “bottom-up perspective focusing on the strategies used by countries, regions, and other economic stakeholders to maintain or improve their positions in the GVC” (Gereffi, 2011).

Table 1. Types of Upgrading in GVCs

Product Upgrading	Moving into more sophisticated product lines
Process Upgrading	Transforming inputs into outputs more efficiently by reorganizing the production process or introducing superior technology
Functional Upgrading	Acquiring new functions (or abandoning existing functions) to increase the overall skill content of activities
Chain Upgrading	Moving into new but related industries

Source: Humphrey and Schmitz, 2002

Previously, upgrading was seen as a move from low to high value-added sectors, which is also known as "functional upgrading". However, in the new paradigm, upgrading began to take place within sectors. The "product upgrading" is a move from low to high value-added activities acquiring competitiveness through a skilled workforce and innovation in production and services. Thus, research and development (R&D), logistics and marketing are necessary sectors for adding higher value. The lead firm stays the same, but there are diverse opportunities to upgrade *within* the value chain.

As existing literatures suggest, Latin American global production network is different to that of Asia or Europe. Unlike other regions, lead firms from North America, Europe or Asia tend to dominate Latin American GVCs.

There is definitely a lack of Latin American lead firm that dominate Latin American value chains. Interestingly, however, Latin American countries are very homogenous in terms of the use of language, colonial histories, and natural resource endowment; but also very heterogeneous, with diverse races, clashes of interests and contrasting policies. Integration efforts have brought this region trade agreements, economic organizations, and much more besides. However, few of these trade agreements can support the claim that they have supported global value chains, as has been seen in Asia. Some determinants that hinder the smooth flow of GVC is found to be complex Rules of Origin (RoO), existing Non-Tariff Measures (NTMs), and still protective economic policies by Latin American governments (Cadestin et al., 2016). It is necessary, then, to investigate what are the determinants of effective integration and upgrading into higher value-added segments of a value chain. This study specifically looks into the manufacturing sector and trade agreements of this region so as to inform policies in the future.

III. Regional Analysis of Latin American GVC: Latin American Trade Decomposition

First, this study will look at the trade in value added at the regional level, before moving onto trade in value added by country. Here, "Latin America" refers to those countries included in the region as part of the Trade in Value Added data set, i.e. the six countries, Argentina, Brazil, Chile, Colombia, Costa Rica and Peru, since Mexico is categorized as belonging to North America in this case[3]. Using the TiVA database, it is possible to decompose trade exports and analyze in detail from where the value added comes from.

Table 2. South and Central American Top Export and Imports, 2011

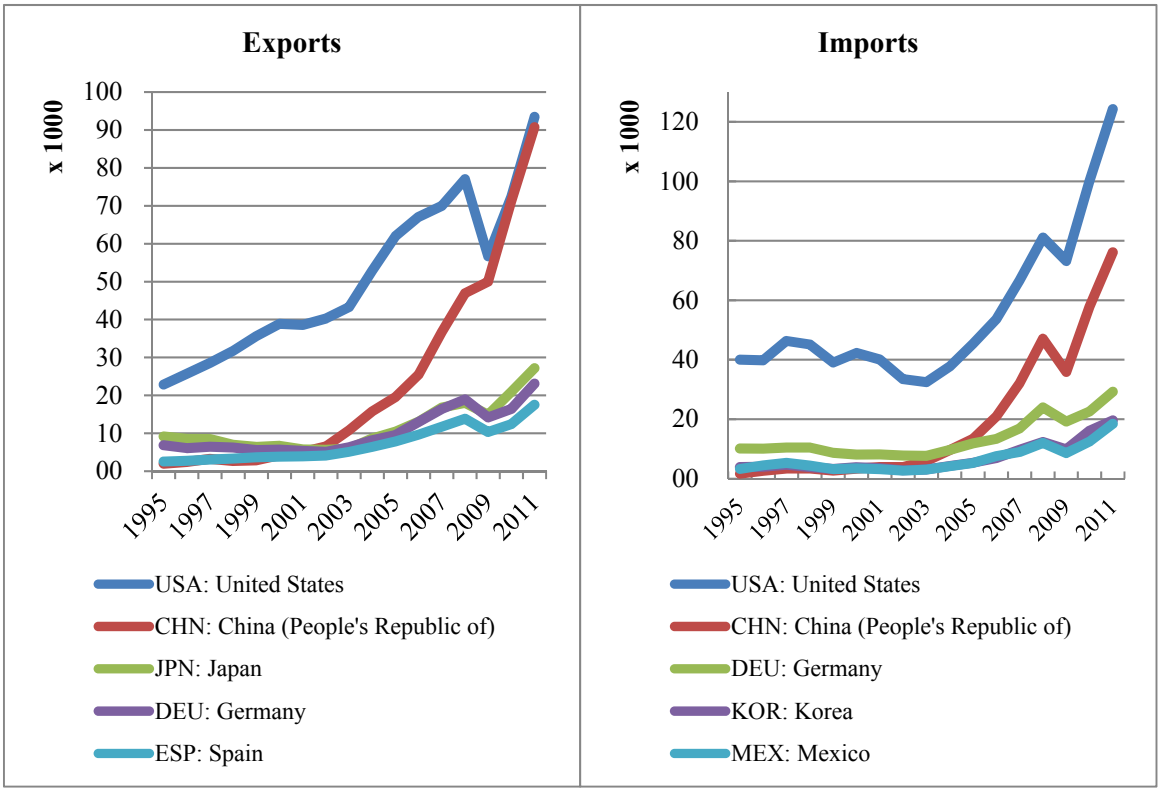
	Gross Exports		On Final Products		On Intermediate Products	
1	USA	93,493.1	USA	27,811.6	CHN	78,117.8
2	CHN	90,763.8	CHN	12,646.1	USA	65,681.4
3	JPN	27,181.4	DEU	6,766.7	JPN	22,414.6
4	DEU	23,101.5	MEX	5,218.7	DEU	16,334.8
5	ESP	17,537.3	JPN	4,766.8	KOR	15,247.9
	Gross Imports		**On Final Products**		**On Intermediate Products**	
1	USA	124,292.1	USA	56,522.4	USA	67,769.7
2	CHN	76,140.6	CHN	41,303.2	CHN	34,837.3
3	DEU	29,235.8	DEU	14,594.5	DEU	14,641.2
4	KOR	19,600.4	KOR	10,949.7	IND	9,624.1
5	MEX	18,441.1	MEX	8,541.1	MEX	8,765.6

Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: millions, Dollars.

[3] The indicator used for "Latin America" in the TiVA database is: "ZSCA: South and Central America".

South and Central American gross exports are mainly destined to the US and China. There are significantly more imports from the US compared to exports. The difference is that while the US ranks as the primary destination for final goods, China receives more intermediate goods from Latin America. China's economy has skyrocketed since its accession to the WTO in 2001 and has become a key export destination for Latin America.

Figure 2. South and Central American Gross Exports and Imports from 1995-2011



Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: millions, Dollars.

Latin American final goods are mostly exported to the member countries of NAFTA, and EU, and East Asia, while intermediate goods are largely destined for East Asia. Undoubtedly, Latin American intermediates represent key inputs for final goods produced in China, Japan and Korea. Cadestin et al. (2016) provides evidence for the transformation of the nature of Latin American exports: from final products to intermediates. In this study, using BACI trade data, the top 10 exports were sorted into different categories, such as raw and semi-processed raw materials (e.g. fuels, iron and copper ores and concentrates, gold, etc.) and agricultural raw materials (e.g. soya beans, sugar cane, and maize). While these categories accounted for less than 30% of the total trade exports volume in the late 1990s, by 2013 this figure had risen to 44%[4]. This decomposition demonstrates a strong dependence on raw materials and primary intermediates in the exports of the region.

[4] The BACI dataset was based on the top 10 export products in the 10 selected Latin American countries. This included Argentina, Brazil, Chile, Colombia, Mexico, and Peru, but excluded Costa Rica, 2012.

Table 3. Top 10 Latin American Regional Exports

Year	HS6	Description	Share of Region's Exports (%)
2012/2013	270900	Petroleum oils and oils obtained from bituminous minerals, crude	18.3
	271000	Petroleum oils & oils obtained from bituminous minerals, o/than crude	4.8
	260111	Iron ores & concentrates, o/than roasted iron pyrites, non-agglome	3.6
	260300	Copper ores and concentrates	3.5
	120100	Soya beans	3.5
	740311	Copper Cathodes and sections of cathodes unwrought	2.9
	710812	Gold in unwrought forms of non-monetary	2.4
	230400	Soya-beans oil cake & oth solid residues, whether or not ground or pel	2.4
	170111	Raw sugar, cane	1.6
	100590	Maize (Corn)	1.5

Source: Cadestin, C., J. Gourdon and P. Kowalski, 2016.

Amongst the principal trading partners of the region, there exist clear patterns in terms of value added. For instance, the US is the key value-adding country and the main partner for the Latin American value chain. China and Japan, along with South Korea, are also adding value to the region. Cadestin et al. (2016) notes that while intermediate exports to countries outside of the region are becoming more intensive, intermediates also occupy an important

share of Latin American intra-regional trade. All in all, intra-regional trade is significantly falling in the region and it is a challenge that needs to be addressed.

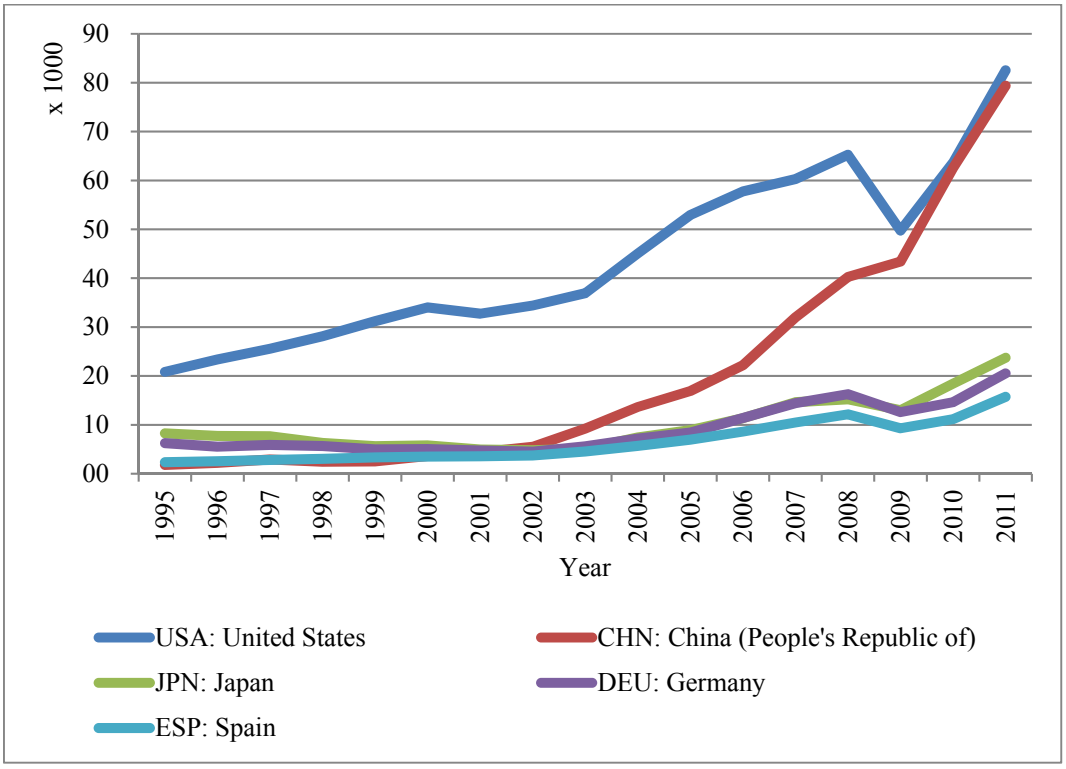
Secondly, when looking at trade in value added, it is possible to analyze the domestic value added of the gross exports. The domestic value added content indicator shows the value added to Latin American exports.

Table 4. Domestic Value Added content of Latin American Gross Exports, 2011

		Domestic Value Added Content of Exports
1	USA	82,535.3
2	CHN	79,388.0
3	JPN	23,731.1
4	DEU	20,523.7
5	ESP	15,737.5

Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: millions, Dollars.

Figure 3. Domestic Value Added content of Latin American Gross Exports, 1995-2011



Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: millions, Dollars.

The US is clearly the major value-adding country for Latin America, as the value added by China increased in parallel with an increase in the volume of gross exports and imports. Although trade not always linked to value added, in this case there is some correlation. Coincidently, the main value-added countries are the top five countries to which Latin American gross exports are headed. The graph is also very similar to the exports graph, compared to the graph for imports.

IV. Analysis of GVC for Latin American countries

At this point, it is important to consider the current status of global value chains in Latin America. This part of the paper measures trade in value added and GVC participation from 1995 to 2011, for each country listed in the Trade in Value Added database by the OECD-WTO, i.e. Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, and Peru. The analysis is organized as follows: first, the decomposition of exports will allow the investigation of each country's export destination for both goods and intermediate goods with each partner dimensions. Then, for the analysis by country, more detailed decomposition will follow, to assess the domestic value added and foreign value added for each country. This way, it is possible to discern how and from where value is added and to where their own values are headed. The second analysis looks at the GVC participation index from 1995-2011. This part will also include the analysis of industries and the value-adding country for each specific industry. Lastly, analysis by country will look closely at the influence of intra-regional PTAs on each country's GVC. As mentioned in the literature review, the GVC participation index can reflect the degree of openness of an economy. Due to the availability of data for Latin America, the trade in value added of seven countries analyzed.

1. Argentina

Argentina was not a business-friendly environment for the period 1995 to 2011. Financial crisis and recession from the late 1990s has stunted its growth rate, and efforts to open up have been an ongoing challenge. Argentina's top export industries are food and beverages, agriculture, and wholesale and retail trade, and most of their value added is domestic. These goods are sent as intermediate products to partner countries.

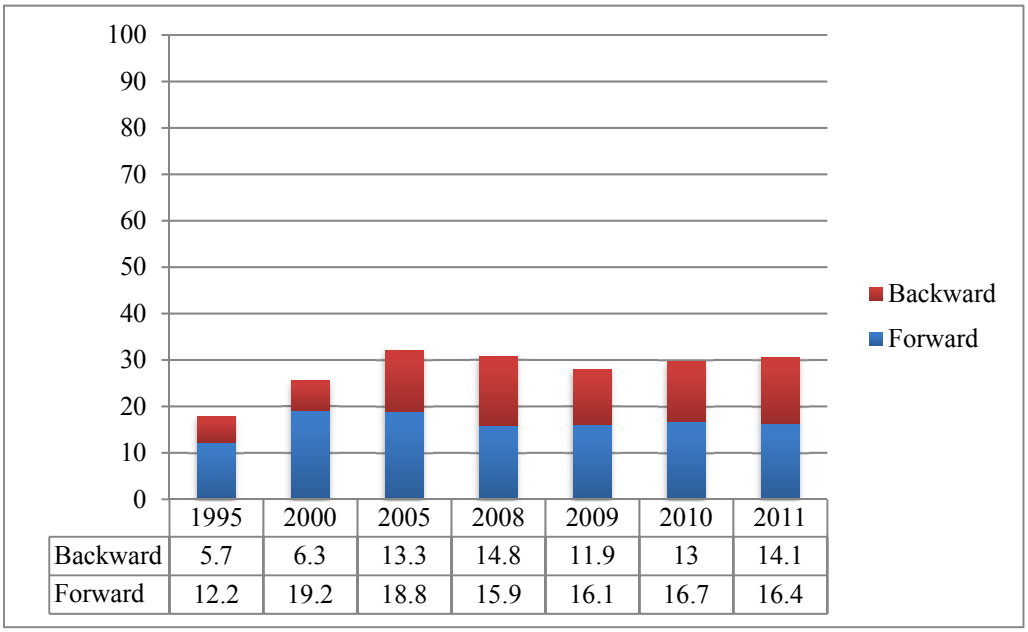
Table 5. Argentina's Decomposition of Exports, 2011

	Gross Exports		On Final Products		On Intermediate Products	
1	BRA	18,061.5	BRA	10,531.0	BRA	7,530.5
2	USA	6,794.6	USA	3,633.5	CHN	4,129.2
3	CHN	6,346.9	CHN	2,217.7	USA	3,161.1
4	CHI	4,818.0	CHI	1,861.6	CHI	2,956.4
5	ESP	3,610.7	ESP	1,417.9	CAN	2,779.2

Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: millions, Dollars.

The top export destinations are Brazil, the US, and China. The top destinations for final products and intermediate products are identical, except for a difference in fifth place, where Spain is the main partner for final products and Canada for intermediate products. Argentinean exports are largely not exported to Asia, except for China. Its economy is mainly dependent on Brazil.

Figure 4. Argentina's GVC Participation Index, 1995-2011



	1995	2000	2005	2008	2009	2010	2011
Backward	5.7	6.3	13.3	14.8	11.9	13	14.1
Forward	12.2	19.2	18.8	15.9	16.1	16.7	16.4

Source: Research data.
Note: Calculations based on OECD's TiVA database.

The change in the total GVC participation for Argentina from 1995 to 2011 is 12.5% (OECD, 2011). Over the years from 1995 to 2011, GVC participation by Argentina has not reached more than 35%. Forward participation is higher as many countries intensively use Argentinean intermediates in their exports. Argentina's large exports of natural resources has led to this high degree of forward participation. In recent years, Argentina has increased its sourcing to the US, and Canada, and its regional neighbors (Cadestin et al., 2016).

Table 6. Argentina's GVC Participation by Industry, 2011

	Forward GVC Participation Top exporting industry to GVCs		Backward GVC Participation Top exporting industry to GVCs	
1	Mining	17.3%	Motor Vehicles	21.5%
2	Wholesale and retail trade	15.7%	Food and beverages	18.7%
3	Agriculture	13.0%	Agriculture	10.7%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: %

Agriculture, mining, and transport and telecommunication services are the industries in which Argentina is more involved in GVCs, with the exports of intermediates. Intermediates are included in the exports of other countries further down the chain. In terms of manufacturing, Argentina also participates in areas such as food, chemicals and transport equipment.

Most of the final demand for manufactured goods and market services in Argentina represents value added that has been created domestically. Argentina is one of the top five countries in the countries studied by the OECD with the highest domestic value added in final demand (OECD, 2009). Domestic value added (direct and indirect) represents the majority of final demand for a large number of products: food, textiles, wood, chemicals and basic metals. Machinery and electrical equipment are the industries that have received the most foreign value added in Argentina (OECD, 2009).

Table 7. Argentina's Value Added shares, 2011

	Value Added in Foreign Final Demand		Foreign Value Added in Domestic Final Demand	
1	BRA	16.3%	BRA	21.1%
2	USA	9.4%	USA	15.5%
3	CHN	6.3%	CHN	9.4%
4	CHI	3.8%	DEU	4.3%
5	ESP	3.3%	ESP	3.3%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: % Shares

In terms of value added, Argentina's total exports represented 0.54% of total world exports (OECD, 2009). Large export industries such as agriculture and food show higher export shares in value added terms than in gross terms, reflecting the relatively high domestic value added content of Argentina's exports. Other industries, such as manufacturing and services show lower export shares. Argentina's export shares in these industries are roughly the same in value added and gross terms.

2. Brazil

As one of the largest economies in Latin America, Brazil's strength is in its strong domestic market. However, while it was has been considered to have an economy of significant potential, as one of the so-called BRICs, Brazil has not shown this growth in recent years. The country continues to be as one of the strongest economies in Latin America, along with Mexico, but the two countries have very different characteristics when it comes to GVC participation. Brazil's top export industries are mining, food and beverages, and wholesale and retail trade - most of their value added is made domestically.

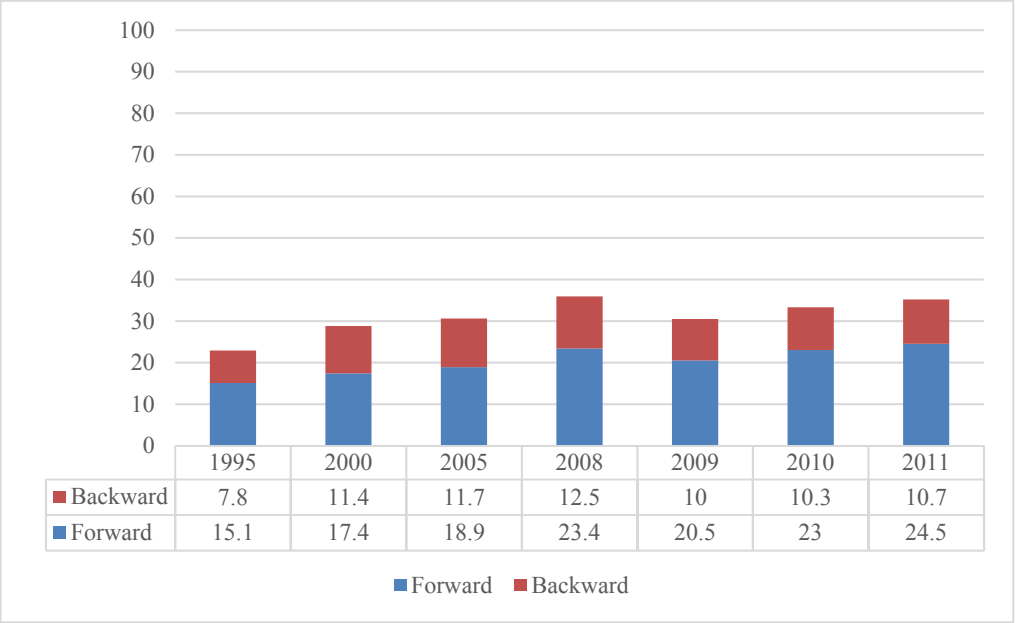
Table 8. Brazil's Decomposition of Exports, 2011

	Gross Exports		On Final Products		On Intermediate Products	
1	CHN	47,628.1	USA	12,510.2	CHN	39,953.9
2	USA	39,106.6	ARG	9,449.5	USA	26,596.4
3	ARG	21,722.3	CHN	7,674.2	ARG	12,272.8
4	DEU	14,124.5	DEU	4,238.7	DEU	9,885.8
5	JPN	12,075.3	RUS	3,031.8	JPN	9,751.3

Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: millions, Dollars.

Brazil's top export destinations are China, the US, and Argentina. Its exports are mostly intermediate products heading to China, whereas its final goods are mainly exported to the US.

Figure 5. Brazil's GVC Participation Index, 1995-2011



	1995	2000	2005	2008	2009	2010	2011
Backward	7.8	11.4	11.7	12.5	10	10.3	10.7
Forward	15.1	17.4	18.9	23.4	20.5	23	24.5

Source: Research data.
Note: Calculations based on OECD's TiVA database.

The evolution of total GVC participation for Brazil from 1995 to 2011 is 14.0% (OECD, 2011). Over the years from 1995 to 2011, the total GVC participation for Brazil has not reached more than 35%. However, Brazil is above the average ratio for forward participation as of 2011. Brazil is an interesting case in that it is abundant with natural resources for export, but it also makes great efforts to boost its manufacturing sector. Its domestically sourced intermediates participate in diverse industries along the value chain.

Table 9. Brazil's GVC Participation by Industry, 2011

	Forward GVC Participation Top exporting industry to GVCs		Backward GVC Participation Top exporting industry to GVCs	
1	Mining	22.9%	Mining	18.1%
2	Wholesale and retail trade	15.4%	Food and beverages	12.7%
3	Other business services	12.2%	Basic metals	9.4%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: %

Brazil's leading industries in GVC participation are mining, wholesale and retail trade. As mentioned previously, Brazil's exporting industries are diverse from manufacturing to food and beverages, but the services industry also plays a highly active role down the value chain (OECD, 2009). Although Brazil is known to have developed its manufacturing technology base from its import substitution period, its current industries participating in GVC are not related to manufacturing (Sturgeon, Gereffi, and Guinn, 2013). With recent countries establishing factories and research centers in Brazil allows spillover effects of high and medium-high technology industries (Guilhoto and Imori, 2014). Study by Guilhoto and Imori (2014) looks at Brazil's GVC participation with fellow BRIC countries stating that China's increasing role in Brazilian exports as figures are expressed from the table above where Brazilian trade in value added with China was largely based on metallurgical activities. They also conclude by stating that much of Brazilian GVC participation is limited to

sourcing intermediates to other countries. Sturgeon et al. (2013) also claim that although Brazil is in a good position for GVC upgrading, the lack of domestic coordination and policies limit Brazil's opportunities.

Table 10. Brazil's Value Added shares, 2011

	Value Added in Foreign Final Demand		Foreign Value Added in Domestic Final Demand	
1	USA	14.9%	USA	19.6%
2	CHN	13.6%	CHN	9.7%
3	ARG	6.0%	DEU	5.8%
4	JPN	4.9%	ARG	4.9%
5	DEU	4.5%	JPN	3.8%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: % Shares

From the figure above, despite China's influence in Latin America, the US still is the key value added player in Brazil. In terms of trade, Brazil along with MERCOSUR has not been the most open economy in Latin America. Although MERCOSUR has free trade agreements with other Latin American countries such as Bolivia, Colombia, whether they have allowed upgrade in GVC for Brazil is not yet clear.

3. Chile

Chile is the first OECD country in Latin America and is also considered to be one of the most developed economies in Latin America. Chile's economy showed economic growth of 5% annually from the late 1990s to the early 2000s. This was due to ambitious liberalization of trade and investment. Its natural resources, especially copper, had played an important role during this period (OECD, 2015).

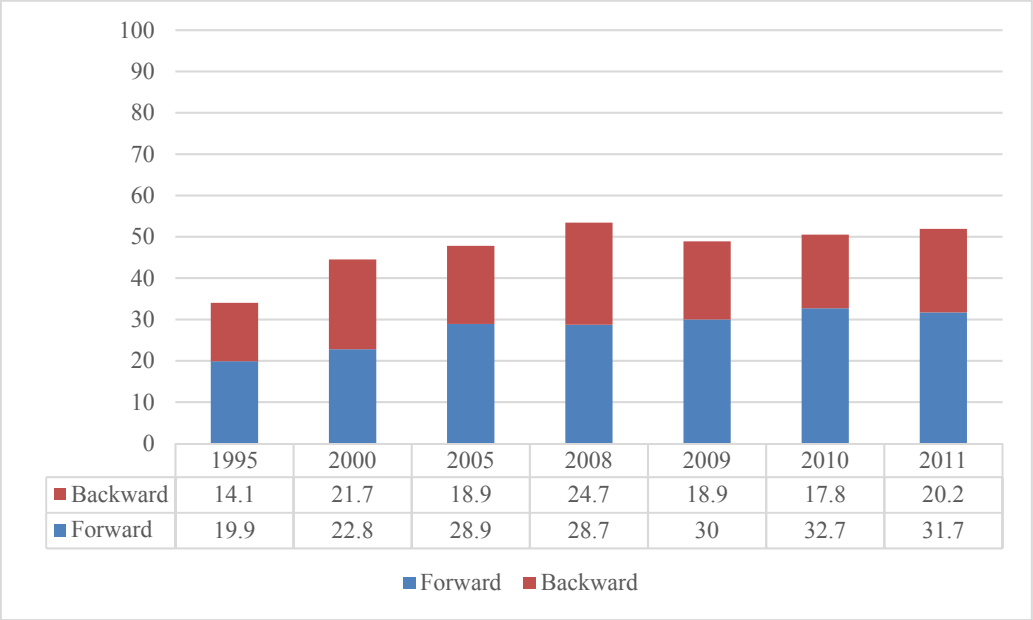
Table 11. Chile's Decomposition of Exports, 2011

	Gross Exports		On Final Products		On Intermediate Products	
1	CHN	21,990.2	USA	3,065.8	CHN	20,601.5
2	USA	9,555.5	JPN	1,466.1	JPN	7,835.7
3	JPN	9,301.9	CHN	1,388.7	USA	6,489.7
4	BRA	6,270.4	BRA	1,330.6	BRA	4,939.8
5	KOR	6,270.4	ARG	1,011.1	KOR	4,780.0

Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: millions, Dollars.

Chile's top export industries are basic metals, mining, and wholesale and retail trade, and foreign value added comes to 21.7% for the basic metals industry. Chile is highly connected in forward linkages in GVCs delivering intermediate inputs for other countries' exports, especially in East Asia. By 2011, Chile was the only country in Latin America that had bilateral FTAs with all three major economies in East Asia: China, Korea, and Japan.

Figure 6. Chile's GVC Participation Index, 1995-2011



	1995	2000	2005	2008	2009	2010	2011
Backward	14.1	21.7	18.9	24.7	18.9	17.8	20.2
Forward	19.9	22.8	28.9	28.7	30	32.7	31.7

Source: Research data.
Note: Calculations based on OECD's TiVA database.

Chile's GVC participation is considered to be one of the highest in Latin America. The evolution of total GVC participation for Chile from 1995 to 2011 is 12.9% (OECD, 2011). Chile is one of the OECD countries that participate actively in GVCs. Its forward GVC participation is especially high with raw resources, but its backward GVC is also active as well. This means that Chilean exports not only serve as intermediates in other countries, but Chile is also open to foreign investments.

Table 12. Chile's GVC Participation by Industry, 2011

	Forward GVC Participation Top exporting industry to GVCs		Backward GVC Participation Top exporting industry to GVCs	
1	Basic Metals	46.5%	Basic Metals	36.3%
2	Mining	16.0%	Mining	14.1%
3	Wholesale and retail trade	7.9%	Transport & Storage and Telecommunication	11.4%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: %

As expected, metal and mining are key industries for Chile's exports. An interesting point is that copper exports are responsible for both Chile's backward and forward GVC (OECD, 2015). Chile not only participates in the forward GVC by producing and providing copper, but also in wholesale and retail trade related to, but not limited to, copper exports. The backward GVC participation industries are also connected to copper exports as the mining industry has the highest share of inward FDI (OECD, 2015). 50% of FDI inflows from 2009-2013 were accounted by the mining industry, and 43% of foreign MNEs in Chile operated in the mining sector as well. Undoubtedly, Chile's open trade agreement policies have led to a high participation in GVCs. Since as far back as the early 2000s, Chile has had FTAs with the EU, India, Malaysia, the US and South Korea. Focusing on their strength, Chile's copper

exports had become a lead source in the global market.

Table 13. Chile's Value Added shares, 2011

	Value Added in Foreign Final Demand		Foreign Value Added in Domestic Final Demand	
1	CHN	15.6%	USA	19.1%
2	USA	14.2%	CHN	12.5%
3	JPN	10.6%	BRA	6.5%
4	BRA	6.3%	DEU	5.4%
5	KOR	3.6%	ARG	4.8%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: % Shares

In 2011, Chilean value added goods mostly go to China, and come from the US. Out of all the Latin American countries analyzed, Chile shows the strongest correlation to the East Asian economies as Chile's value added contributes to each of China, Japan and Korea's final demand. In terms of intra-regional GVC, China contributes more to Chile's forward linkages than neighboring countries such as Argentina and Brazil. In terms of GVC upgrading, it can be suggested that Chile's participation in cooper GVC can move from producing at the early stage than to upgrade within the functional value chain. Which means, Chile cannot only produce copper, but also may move up to the value chain in higher value-adding segments with its knowledge spillovers from foreign firms residing in Chile.

4. Colombia

The Colombian economy began to thrive in the late 1990s. It is currently engaging in more trade agreements intra-regionally (MERCOSUR in 2004, Costa Rica in 2013, Chile, Mexico, and Peru in 2014) and extra-regionally (Canada in 2008, USA and EU in 2012, South Korea in 2013). These agreements not only generate new opportunities for the expansion of Colombian exports but also allowing foreign investment into Colombia (Hérnandez, Martínez and Mulder, 2014).

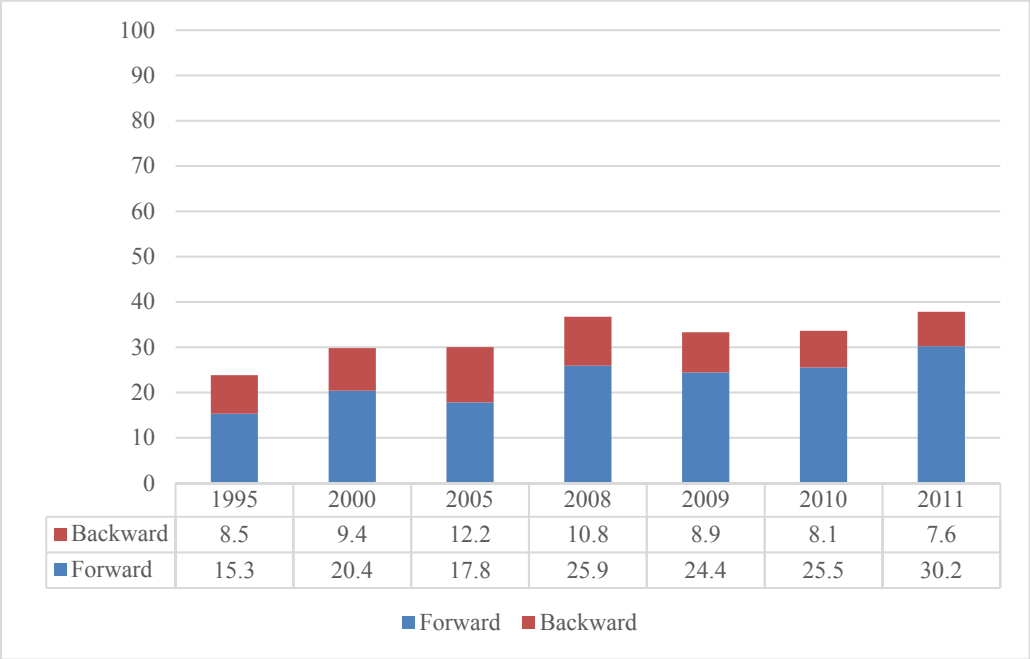
Table 14. Colombia's Decomposition of Exports, 2011

	Gross Exports		On Final Products		On Intermediate Products	
1	USA	25,833.0	USA	3,480.5	USA	22,352.5
2	CHI	3,356.7	PER	577.5	CHI	2,979.5
3	CHN	3,155.0	BRA	472.0	CHN	2,978.2
4	ESP	2,177.0	DEU	438.0	ESP	2,001.9
5	DEU	2,014.9	MEX	422.4	DEU	1,576.9

Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: millions, Dollars.

Its top export destinations are the US, China and Chile. Colombia's geographical location has made it easier for it to trade with both Pacific and Atlantic countries. Colombia also exports more intermediates than final products, in its participation in GVCs.

Figure 7. Colombia's GVC Participation Index, 1995-2011



	1995	2000	2005	2008	2009	2010	2011
Backward	8.5	9.4	12.2	10.8	8.9	8.1	7.6
Forward	15.3	20.4	17.8	25.9	24.4	25.5	30.2

Source: Research data.
Note: Calculations based on OECD's TiVA database.

From this figure, the change in the total GVC participation of Colombia from 1995 to 2011 is 14.2% (OECD, 2009). Over the years from 1995 to 2011, GVC participation for Colombia has reached more than 37%, which is high in comparison to fellow Latin American countries.

Table 15. Colombia's GVC Participation by Industry, 2011

	Forward GVC Participation Top exporting industry to GVCs		Backward GVC Participation Top exporting industry to GVCs	
1	Mining	63.6%	Chemical products	13.5%
2	Wholesale and retail trade	9.6%	Basic Metals	12.0%
3	Basic Metals	4.0%	Mining	11.7%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: %

The mining industry in Colombia is highly important, with about 70% of its extracted coal exported and 30% used for Colombian households and in domestic industries, such as textile factories and electricity power stations (Hérnandez et al, 2014). In terms of value added, most of foreign value added coming to Colombia was from the manufacturing industry.

Table 16. Colombia's Value Added shares, 2011

	Value Added in Foreign Final Demand		Foreign Value Added in Domestic Final Demand	
1	USA	37.7%	USA	24.3%
2	CHN	5.1%	CHN	10.6%
3	DEU	3.7%	MEX	6.5%
4	BRA	3.3%	DEU	4.8%
5	CHI	3.0%	JPN	4.4%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: % Shares

In terms of value added, Colombia has a high degree of trade with the US. Colombia shows characteristics of both Central American countries, like

Mexico and Costa Rica, but also shares similar features with countries in *Cono Sur*. Its close economic ties with the US and countries in Europe and Asia show a high level of forward GVC participation. On the other hand, it has in common with countries like Argentina and Brazil, a large domestic market and policies less conducive to GVC (Cadestin et al., 2016). Colombia's efforts for a more open market and signing trade agreements are expected to strenghten existing trade relationships with partner countries.

5. Costa Rica

The Costa Rican case is different in many ways to other Latin American countries. As a small country with very limited resources, Costa Rica has led Latin America as a leader for trade liberalization at both multilateral and bilateral levels. It has also attracted various foreign direct investment (FDI) streams and has ensured a stable economic and political environment. Research has found that 43% of Costa Rica's total exports take part in the GVCs of five industries: electronics, medical devices, automotive, aeronautic/aerospace, and film/broadcasting devices (Monge-Ariño, 2011).

Table 17. Costa Rica's Decomposition of Exports, 2011

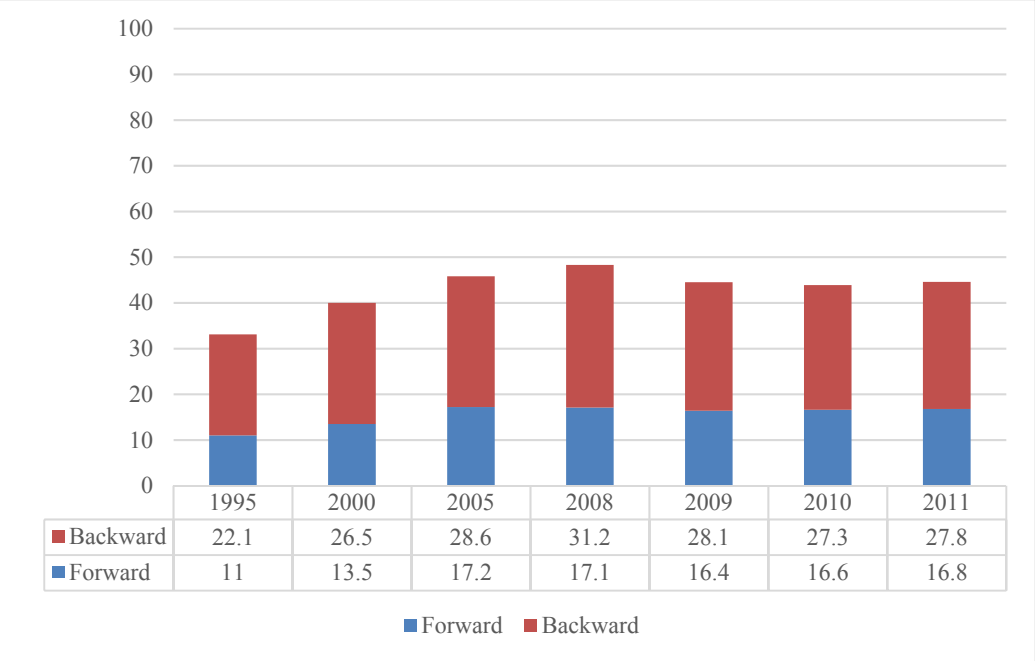
	Gross Exports		On Final Products		On Intermediate Products	
1	USA	5,134.4	USA	2,705.8	USA	2,428.6
2	CHN	1,886.1	CHN	504.3	CHN	1,381.9
3	MEX	807.6	MEX	364.1	MEX	443.5
4	MYS	494.7	DEU	133.0	MYS	386.1
5	DEU	383.4	BRA	132.9	DEU	250.4

Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: millions, Dollars.

Its top export destinations are the US, China, and Mexico. The US has been Costa Rica's most important trade partners, even in the absence of any PTA or FTA. Costa Rican processing and exporting inputs have been integrated into American supply chains (Cadestin et al., 2016). China has also emerged as

one of the key countries for Costa Rican value added. A FTA between Costa Rica and China entered into force in 2011, which explains the increase of value added between the two countries.

Figure 8. Costa Rica's GVC Participation Index, 1995-2011



	1995	2000	2005	2008	2009	2010	2011
Backward	22.1	26.5	28.6	31.2	28.1	27.3	27.8
Forward	11	13.5	17.2	17.1	16.4	16.6	16.8

Source: Research data.
Note: Calculations based on OECD's TiVA database.

As Monge-Ariño argues, PTAs have been an effective tool for Costa Rica's increase in GVC participation. Costa Rica's backward participation is notably higher than its forward participation. Over the years from 1995 to 2011, GVC participation by Costa Rica has been mostly dominated by the electronics

industry. Costa Rica has strong forward GVC participation in the computer, electronic, electrical and optical equipment industries.

Table 18. Costa Rica's GVC Participation by Industry, 2011

	Forward GVC Participation Top exporting industry to GVCs		Backward GVC Participation Top exporting industry to GVCs	
1	Wholesale and retail trade	17.7%	Computer and electronic	55.3%
2	Computer and electronic	17.3%	Agriculture	8.4%
3	Other business services	14.5%	Transport and storage	5.4%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: %

For the first time in this paper, the "computer and electronic" sector has appeared as a top export industry for GVCs in Latin America. Costa Rica has specialized in the areas of medical devices and other electronics.

Table 19. Costa Rica's Value Added shares, 2011

	Value Added in Foreign Final Demand		Foreign Value Added in Domestic Final Demand	
1	USA	34.7%	USA	35.2%
2	CHN	7.3%	CHN	7.0%
3	MEX	3.5%	JPN	4.4%
4	DEU	3.1%	MEX	4.4%
5	JPN	2.8%	COL	3.8%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: % Shares

As large firms (mainly from the US) start their local operations in Costa Rica, there are also knowledge spillovers seen in the country (OECD, 2015). By attracting knowledge-intensive FDI, Costa Rica can also add higher values further down the chain. Hence, Costa Rica can add value even to countries with strong manufacturing industries such as Japan and Germany.

6. Mexico

Mexico is another OECD country in Latin America with a high dependency on the US economy. Having a strong manufacturing industry, Mexico has been active in opening its doors for trade and investment. According to the Mexican Ministry of Economic Affairs, Mexican manufacturing has exceeded the levels of the rest of Latin America put together. Mexico is also the country with the greatest number of PTAs and FTAs in Latin America, but its high integration in North American supply chain comprises most of Mexico's trade.

Table 20. Mexico's Decomposition of Exports, 2011

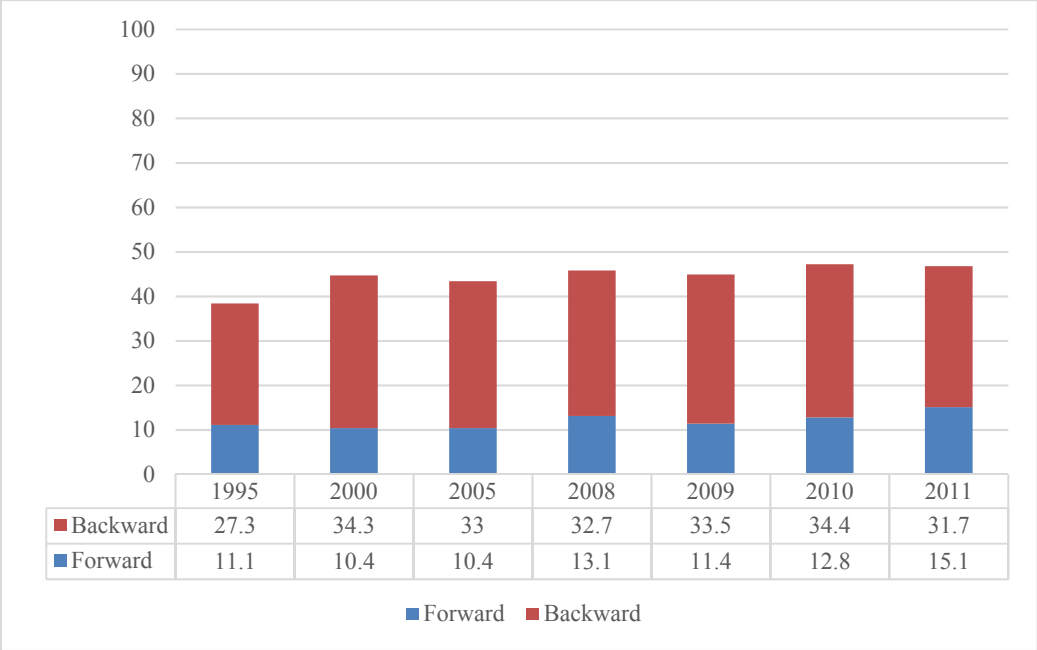
	Gross Exports		On Final Products		On Intermediate Products	
1	USA	241,364.2	USA	92,328.6	USA	149,035.6
2	CAN	25,220.7	CAN	11,207.1	CAN	14,013.5
3	CHN	10,892.9	COL	3,201.1	CHN	8,649.6
4	COL	6,193.9	BRA	3,098.2	ESP	5,337.4
5	ESP	5,913.1	CHN	2,243.3	COL	2,992.8

Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: millions, Dollars.

Its top export destinations are clearly the US and Canada, but China is also becoming an important partner. The values for intermediate products are also significantly higher. Mexico has FTAs with many Central and South American countries, and with the EU. Its open market allows for investment,

exports to a wide range of partners, and industry development.

Figure 9. Mexico's GVC Participation Index, 1995-2011



	1995	2000	2005	2008	2009	2010	2011
Backward	27.3	34.3	33	32.7	33.5	34.4	31.7
Forward	11.1	10.4	10.4	13.1	11.4	12.8	15.1

Source: Research data.
Note: Calculations based on OECD's TiVA database.

Mexican GVC participation has features similar to Costa Rica and Central American countries. Its backward participation is mainly due to assembly factories from the US, Europe and Asia; its forward participation is thanks to its natural resources in mining. However, with foreign investment, Mexico has become a manufacturing powerhouse in Latin America. It has also created the identity as "a platform for MNEs seeking for labor-intensive aspects

of GVCs". (Gereffi, 2015)

Table 21. Mexico's GVC Participation by Industry, 2011

	Forward GVC Participation Top exporting industry to GVCs		Backward GVC Participation Top exporting industry to GVCs	
1	Mining	34.7%	Motor Vehicles	29.3%
2	Wholesale and retail trade	16.2%	Computer and electronic	26.7%
3	Basic Metals	9.8%	Electrical machinery	11.0%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: %

Table 21 shows that Mexican backward participation is in the 'motor vehicles' and 'computer and electronic' industry. Mexico's the American lead firms own much of value chain. Which could imply that despite its high participation in the GVC, the positive profit does not end up in Mexico's end. According to Castillo and Szirmai, the contribution of domestic inputs in creating value added in Mexico (domestic) was much larger than that in Mexico (Maquiladora/Global). Their study confirms that the increase in participation in the GVC for Mexican firms did not induce a new pattern of specialization "because those firms were not subject to significant competitive pressures from low cost producers in supplying the domestic market" (Castillo and Szirmai, 2016). In terms of upgrading, ability for firms to stay competitive in terms of price, high quality standards allows them to move up the value chain in evolving to a 'functional' upgrading or 'chain' upgrading. Trade agreements

have shown significance in Mexico, but it does not necessarily imply that it has only brought positive results for Mexican firms.

Table 22. Mexico's Value Added shares, 2011

	Value Added in Foreign Final Demand		Foreign Value Added in Domestic Final Demand	
1	USA	62.9%	USA	46.4%
2	CAN	6.5%	CHN	8.2%
3	CHN	3.5%	JPN	5.3%
4	BRA	1.9%	CAN	4.5%
5	JPN	1.8%	DEU	4.3%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: % Shares

Mexico has the benefit of geographical location next to the US and Canada. Its policies have ensured a tight network with its fellow North American economies, but it should not stop here. As Mexican trade specialization moves from mining and agriculture to manufacturing, services sector is also the next step Mexico must move forward to.

7. Peru

Peru is an emerging economy in Latin America as it thrives to engage in more economic trade agreements. Its efforts to trade with diverse partners are increasing. Only in the years from 2009 - 2012, FTA with the US, China, Thailand, South Korea, Japan, and the EU came into force. If coordinated well with appropriate implementation, it is only matter of time for Peru to diversify its trade specifications and have economic growth.

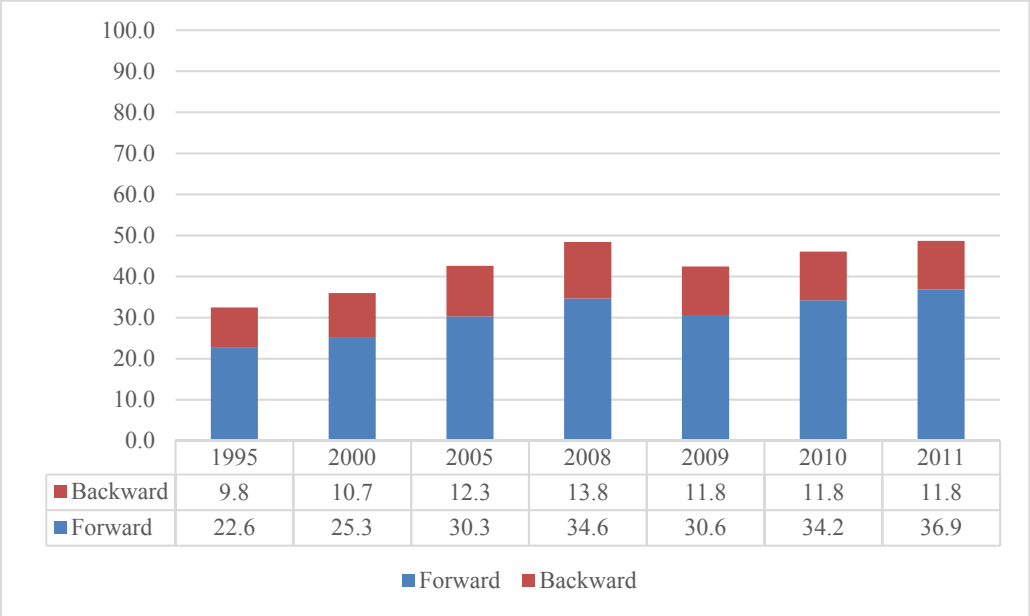
Table 23. Peru's Decomposition of Exports, 2011

	Gross Exports		On Final Products		On Intermediate Products	
1	CHN	9,757.4	USA	2,415.8	CHN	9,073.1
2	USA	7,068.8	CHN	684.3	CAN	4,856.2
3	CAN	5,060.4	ESP	486.6	USA	4,653.0
4	JPN	3,347.9	COL	445.4	JPN	3,092.9
5	ESP	3,106.9	FRA	400.3	KOR	2,733.0

Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: millions, Dollars.

In 2011, the top export destinations are China, USA, and Canada. Peru's location makes it possible for it to reach North America as well as Asia. Because the data used for this paper is updated till 2011, the results for the trade agreements are not included in this analysis.

Figure 10. Peru's GVC Participation Index, 1995-2011



	1995	2000	2005	2008	2009	2010	2011
Backward	9.8	10.7	12.3	13.8	11.8	11.8	11.8
Forward	22.6	25.3	30.3	34.6	30.6	34.2	36.9

Source: Research data.
Note: Calculations based on OECD's TiVA database.

Over the years from 1995 to 2011, GVC participation for Peru has reached almost 50%, which is expected to be higher with more trade agreements have been enforced. Study by Flores and Vaillant in 2011 had found that although export sophistication is low for Peru, but was ranked among countries that these goods gain specialization. This implies that Peru is participating in a recent modernization of their export baskets- particularly where intermediate processed goods are concerned, which in the case of Peru would be mining.

Table 24. Peru's GVC Participation by Industry, 2011

	Forward GVC Participation Top exporting industry to GVCs		Backward GVC Participation Top exporting industry to GVCs	
1	Mining	58.3%	Mining	26.5%
2	Basic Metals	11.1%	Basic Metals	22.6%
3	Transport & Storage and Telecommunication	7.5%	Chemical Products	17.4%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note:

Peru having a competitive advantage in sourcing the natural products, over time, the mining sector had developed expertise in the lower value segments- becoming a supplier for both global Original Equipment Manufacturers (OEMs) and mining clients (Bamber, Fernandez-Stark and Gereffi, 2016).

Table 25. Peru's Value Added shares, 2011

	Value Added in Foreign Final Demand		Foreign Value Added in Domestic Final Demand	
1	USA	18.8%	USA	18.2%
2	CHN	17.5%	CHN	12.7%
3	JPN	7.9%	BRA	5.9%
4	CAN	5.8%	JPN	5.0%
5	ESP	4.6%	DEU	4.0%

Source: Calculations based on OECD-WTO Trade in Value Added Database, June 2017.
Note: % Shares

In terms of mining, Peru has a close relationship with Chile, another mining specialized country- and there are rooms for intra-regional GVC within this sector. In addition to mining, Peru has increased its forward participation in business services, which could be interpreted as efforts for upgrading products.

8. Findings

The GVC analysis by country of seven different Latin American countries reveals a significant heterogeneity across the region. Firstly, the countries in the north show significantly different characteristics from the countries down in *Cono Sur*. Costa Rica and Mexico are more inclined to participate in the North American GVC, rather than the Latin American GVC. They participate in backward GVCs with high involvement from the US economy. Also, in terms of the specific industry, they are concentrated in the assembly stages of electronics and motor vehicles. They feature in the low value-adding segments of the value chain.

On the other hand, countries like Argentina, Brazil and Chile participate in backward GVC due to their rich natural resources. Brazil and Chile also have strong relations with East Asia as they source their intermediates to this region. All in all, regardless of whether these countries are participating in upstream or downstream segments of a GVC, their participation is in the low-segments. The lack of lead firms in Latin America leaves these economies participating in the lowest segments of the value chain.

Lastly, trade agreements have not been an effective tool to enhance the regional value chain. Countries like Mexico and Chile have many trade

agreements with different partners, but the provisions focus on the raw materials of Latin America. This will be explored in the automotive industry case study below. Latin American PTAs create a “spaghetti bowl” effect in which the overlapping PTAs restrict the development of GVCs (Cadestin et al., 2016). It is also found that Latin American PTAs do not necessarily aim to ensure the free movement of goods, services and capital. Rather, these agreements aim to promote and regulate trade among member countries and to implement economic cooperation activities in order to expand markets, but without the ultimate goal of free trade (WTO, 2015).

In sum, the low intra-regional GVC participation of Latin American countries is due to 1) specialization in low value-added segments, 2) the outwards orientation of downstream GVC participation in the northern Latin American countries, and 3) a low degree of openness, despite the numerous PTAs in the continent overall (OECD, 2015).

V. Case study: Automobile Industry

1. Automobile GVC in Latin America

The automobile industry has been more commonly regarded as a regional value chain than a global value chain (Humphrey and Memodovic, 2003; Strugeon and Van Biesebroeck, 2011). The value chain has become more regionally specialized into clusters, shifting to countries with lower operating costs within regions of the value chain. The few and powerful lead firms, are mainly in charge of vehicle assembly, design and branding. They partner with mega-suppliers who link with first, second, third-tier suppliers around the world. All these actors add value to the automobile global value chain. With so much allocation and flow of the materials and information, the automotive industry is stands in stark contrast with other manufacturing industries in that reason (Strugeon and Van Biesebroeck, 2011). The regional clusters are specialized so as to produce the bulky parts and components close to assembly plants, whereas the lighter parts are imported from all over the world. Thus, the specialization differs across regions depending on the design, final assembly and the different types of inputs, such as electronic components and labor-intensive components, etc. Latin American countries play a role in the assembly and manufacturing segments of this value chain. This part of the paper will analyze the roles of

Latin America in the automotive GVC. It will start by reviewing the intra-regional automotive GVC in Latin America. By looking at TiVA, it is possible to identify, which value added by Latin American automobile industry contributes to foreign final demand, and to which countries the value added by Latin American countries is exported.

Table 26. Domestic Value Added in Foreign Final Demand, shares (2011)

Chile		Mexico		Argentina		Brazil		Colombia		Costa Rica		Peru	
BRA	42.5	USA	67.4	BRA	64.8	ARG	40.3	CRI	22.0	USA	48.4	CHI	24.7
ARG	10.4	CAN	10.2	DEU	3.6	USA	10.2	USA	8.8	MEX	5.1	USA	7.5
COL	8.7	BRA	3.4	MEX	2.9	MEX	10.2	PER	3.7	CAN	4.0	MAR	2.3
USA	5.2	COL	3.0	USA	2.8	CHI	4.0	CHI	1.4	CHN	3.7	CHN	2.0
MEX	2.9	DEU	2.6	CHI	1.7	DEU	3.0	BRA	1.3	JPN	1.9	CAN	1.4

Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: % Shares

By looking at the domestic value added and foreign value added in domestic final demand for each country in Latin America, Table 26 shows the shares of each country's value added in a foreign country. High value share can be seen in Mexico's value added in the U.S. final demand, along with Argentina's value added in Brazil's final demand. Table 26 shows which countries are important for each partner country. For example, Chile's value

added is important for Brazil and other Latin American countries, compared to where Chile's value added contributes to from the table below.

Table 27. Value Added Share of Total Final Demand by Source Country and Industry, shares (2011)

Chile		Mexico		Argentina		Brazil		Colombia		Costa Rica		Peru	
KOR	14.0	MEX	47.0	ARG	39.1	BRA	71.3	COL	17.7	JPN	18.0	PER	26.7
CHN	11.4	USA	21.3	BRA	24.4	ARG	3.9	MEX	14.8	USA	11.7	JPN	13.4
JPN	11.3	JPN	7.3	DEU	5.3	USA	3.8	USA	13.6	DEU	10.1	CHN	12.6
DEU	10.0	DEU	7.2	KOR	4.5	DEU	3.5	FRA	7.0	KOR	9.3	KOR	8.9
USA	9.5	CHN	3.8	CHN	4.2	KOR	3.3	KOR	6.7	CHN	7.5	USA	5.9

Source: OECD-WTO Trade in Value Added Database, July 2017.
Note: % Shares

The table 27 gives an indication of overall size of the contribution to the foreign final demand. For example, in the case of Chile, Chile accounts for 14% of the value of automotive sales in Korea. Although domestic value added partner shares are mostly in Latin America, Chilean value added accounts in top three East Asian countries: South Korea, China and Japan. Mexico also has 67% of partner share in the US, but accounts for 21.3% of the value of all automotive sales in the US. Argentina has partner share in Brazil with 64% but accounts for about 24.4% of the value of Brazilian automotive sales. Brazil,

having a strong domestic automotive industry accounts to its own value added with 71.3%. Colombia accounts values across North America, Europe and Asia. While Peru's partner shares are largest in Chile, Peru accounts most of is values in the East Asian automotive sales.

Table 28. Foreign Value Added in Domestic Final Demand, Shares (2011)

Chile		Mexico		Argentina		Brazil		Colombia		Costa Rica		Peru	
KOR	16.9	USA	39.3	BRA	44.9	ARG	18.1	MEX	28.1	JPN	21.3	JPN	20.8
JPN	15.2	JPN	15.2	DEU	10.6	DEU	14.8	KOR	12.1	DEU	12.0	CHN	15.5
CHN	12.9	DEU	14.9	MEX	8.8	KOR	13.9	CHN	9.1	KOR	11.1	KOR	13.6
DEU	10.8	CHN	6.4	CHN	4.5	CHN	10.2	JPN	8.2	USA	10.3	DEU	8.1
USA	7.7	KOR	5.9	JPN	4.4	MEX	9.2	DEU	7.6	CHN	7.3	USA	6.6

Source: OECD-WTO Trade in Value Added Database, June 2017.
Note: % Shares

When it comes to foreign value added, it shows which country's value added comes to domestic automobile final demand. By comparing with Table 26, the bilateral interaction between two countries can be observed here. For example, in the case of Chile, 42.5% of Chile's value added goes to Brazilian automobile industry, while 16.9% of Chilean final demand comes from Korean value added. For the case of Chile can be explained by the increase in trade between East Asia and Chile. For Mexico, 77.6% of its value added goes to the

North American partner countries. The case of Mexico will be discussed deeper in the following, but in Mexico, the range of activities in the automotive value chain is very diverse, since it supplies the needs of Japanese, German and American automakers in both Mexico and the U.S. market. Argentina has a special connection to Brazil's automotive market. The MERCOSUR agreement in 1995, vehicle trade liberalization in Brazil in the early 1990s, and the similar policies on automobile industry for both countries determined the increase in trade between the two countries. However Brazil at that time was an attractive market for global lead firms as well, and the international division of labor for Brazil had become immensely complex (Laplane and Sarti, 1999). Although Brazil's dependency is less marked, Argentina still adds value for Brazil's automotive industry.

According to Gereffi from the report for United Nations Industrial Development Organization (UNIDO) report in 2015, within Latin American automotive industry, there is a contrast in patterns of GVC participation- from Mexico and Brazil. Both two countries have attracted significant amounts of FDI into the automotive sector, but the role played by the MNEs is different. As we have seen from the country analysis, Mexico is highly involved in backward GVC while Brazil is more focused in forward GVC. A more thorough study on the automotive industry supports this fact. Mexican automotive GVC is part of

North American automotive GVC, but it is not in the high-value adding sector. Brazil on the other hand shows a different type of GVC where countries from the lead firms establish R&D centers and create knowledge-spillover in this region.

2. Analysis at the country level: Mexico and Brazil

Castillo and Szirmai (2016) divide Mexican manufacturing industries into two sets of firms: 1) those primarily producing for foreign markets, such as the *maquiladora*, and 2) those producing for the Mexican domestic market. According to them, the automotive industry fits in the former "global" manufacturing category, as lead firms reallocate intermediate inputs from foreign countries because of trade and tariff incentives. The Mexican automotive industry began as early as 1980s and began to thrive with the signing of NAFTA in 1994 (Gereffi, 2015). Mexico had eight assembly plants in operation, producing nearly one million vehicles a year. By 2010, this number had increased to 22 assembly plants, producing 2.2 millions units. During this period, the number of global suppliers related with these plants had also increased from 600 to 2,200 (Contreras, Carrillo and Alonso, 2012). While Mexico's low-cost labor has attracted global investment from the US, Europe and Japan, the Mexican automotive industry is highly integrated in the North American production chain. Most foreign lead firms and suppliers have control over vehicle designs and investment, which are the high value-added segments. Sturgeon and Van Biesebroeck (2011) calls the Mexican case "dependent development in a peripheral producer". They prove that, while proximity to the US and the degree of openness has brought significant investment for the

Mexican automotive industry, its Mexican production has become too dependent. In 2008, the Mexican automotive was severely hit by the US financial crisis, but at the same time found it necessary to develop other capabilities in the value chain and decrease US dependency.

Table 29. Mexican Automobile Exports, by destination, 2007-2008

	Exports			Difference (%)	Share (%)	
	2007	2008	Difference	2008-2007	2007	2008
United States	1,203,947	1,175,513	-28,434	-2.4	74.6	70.8
Canada	88,710	112,606	23,896	26.9	5.5	6.8
Latin America	101,301	121,162	19,861	19.6	6.3	7.3
Asia	12,098	35,975	23,877	197.4	0.7	2.2
Europe	194,744	213,754	19,010	9.8	12.1	12.9
Other	12,513	2,383	-10,130	-81.0	0.8	0.1
Total	1,613,313	1,661,394	48,081	3.0	100.0	100.0

Source: ECLAC, on the basis of statistics obtained by the Mexican Automotive Industry Association
Note: Units & percentage.

In 2011, Mexico accounted for 20% of the value of all automotive sales in the US. Mexico is still home to suppliers of North American, European and

East Asian automotive parts, but Mexico continues to participate in the low value-added segments. A different phenomenon arises in the southern end of South America, where a country's automotive GVC is quite different to the case of Mexico.

The automotive industry in Brazil emerged with the import substitution policy of the 1950s. After protective policies on its domestic until the 1990s, tariff reductions led to trade with MERCOSUR countries and inflows of FDI. During this time, Brazil emerged as an "assembler-supplier" relation, where both suppliers and contractors become more involved with their customers, thus involving more specification of the production and quality systems (Humphrey, 1999). In recent years, Brazil's large domestic market has attracted foreign investment, with many lead firms establishing production networks in Brazil. Urlike and Colovic (2009) analyzed the strategies pursued by MNEs and finds that R&D activities create higher value in the host country. This could lead to a higher value added in the long run. The establishment of R&D centers enhances the autonomy and importance of local subsidiaries. In Brazil, the local suppliers are more fully integrated into the operations of the MNEs, with higher levels of local innovation and R&D capabilities (Gereffi, 2015). Companies such as Renault, Ford and General Motors have established production facilities and R&D centers in Brazil. Rather than using the strategy usually applied by

manufacturers, which is to adapt an existing model, the parent company asked its Brazil facility to develop a new model to meet the needs of consumers in different countries. (Urlike and Colovic, 2009).

3. Findings

This part of the analysis has looked at the characteristics of the Latin American GVC in the automotive industry. While Mexico and Brazil share similar strengths in the automotive industry, in practice their participation in the GVC is different. While Mexico successfully leads the assembly production segments, Brazil cooperates with other foreign firms in adding value to innovation and R&D sectors. In terms of upgrading its role in the GVCs, Brazil is showing a "functional upgrading" within the automotive value chain. This also implies that the automotive GVC has created more jobs in Mexico, but led to higher skill levels and technological capabilities in Brazil (Gereffi, 2015). The Mexican automotive value chain is also highly dependent on North American production, while Brazil's counterparts are diverse. Needless to say, most of the lead firms for both countries are non-Latin American firms. This leaves Latin American countries to participate in only certain segments of the value chain.

A further aspect for consideration is trade agreements in and out of Latin America. As mentioned above, the intertwined PTAs and the RoO may discourage the inflow of goods. This may also apply in the case of the automotive industry. The structure has made it possible for European countries

to import raw materials from Latin America for lower tariffs than would apply to the completed vehicle. Simply put, a Latin American exporter of aluminum ore would pay no tariff to enter the European market, but would face a tariff of 4% to export an entire engine. This generates disincentives for Latin American exporters to move beyond the supply of raw materials, leaving them in the low value-added segment (Blyde, 2014).

VI. Conclusion

1. Conclusion & Policy Implications

To the question “do RTAs and FTAs promote and enhance GVC participation?” Yes, they do. Then, do they help in the upgrading of GVC? Not necessarily. Since, as seen with Mexico, having the largest number of FTAs does not necessarily translate to greater participation in a higher segment of GVCs. For example, China and the EU are important trade partners within Latin America, but not all countries have agreements with these large economies, or the agreements have only very recently been made. Having trade agreements is important: in an age where GVCs are thriving as an opportunity for small enterprises to participate in the global economy, trade agreements should be supportive. The inefficiency of intra-regional RTAs related to Rules of Origin (RoO) also hampers the expansion of GVCs in Latin America (Cadestin et al, 2016). Unlike RoO in ASEAN agreements, Latin American intra-regional RoO overlap, duplicate and conflicts. A study by Cadestin et al (2016) suggests that the RoO in Latin American PTAs of effectively undo the positive trade effects, especially with respect to the trade of intermediates.

With extensive research and analysis on the intra-regional GVCs in Latin America, this paper has reviewed the low participation and the factors that

discourage it from the perspective of trade agreements. Studies have shown that integrating effectively into the global value chain leads to economic development (Gereffi and Lee, 2012). It is not only necessary to participate in the global value chain, but to analyze how each economy can engage in a higher value-adding segments. This paper has analyzed the Latin American GVC and has found that this region is becoming an intermediates supporter to the North American and East Asian region, i.e. the goods concerned are low value-added goods. The perpetuation of this process will not present the best opportunities for the region. Latin American governments need to find other ways to engage in higher segments of the GVC. For example, incentives that encourage intra-regional value chain could be a possibility. Unlike Asia and Europe, lead firms were mostly of a non-Latin American background, which meant GVC participation in Latin America was limited to low value-added participation.

The first implication of this paper is the effective use of RTAs that are GVC-friendly within Latin America. Countries should match the existing production network with their main vertical trade partners. Provisions that look at engaging GVCs and encouraging trade liberalization is needed. Even though there are a great number of PTAs within Latin America, if they are not currently serving to facilitate GVC, there remains a need for protection levels to be

lowered still. Latin American PTAs need to eliminate complicated Rules of Origin and Non-Tariff Measures to help Latin American intra-regional GVCs.

The second implication is knowledge spillover. As we have seen from the case of Brazil, participating in high value-added segments is necessary to improve a country's standing within the value chain. The transition from mining and agriculture to processed manufacturing products is an example of such "product upgrading". This has been occurring in some Latin American countries such as Chile, Peru and Mexico, but upgrading should not be limited to these few. Functional upgrading within the value chain is the new paradigm in the value chain as it allows firms to participate and innovate into the global market. Enhancing capabilities and knowledge could later result in the emergence of lead firms in Latin America, which could pave the way for a more effective intra-regional GVC.

2. Limitations and further research

This paper has supplemented the previous research on the global value chain, with a focus on the intra-regional GVC in Latin America. With analysis at both the regional and country levels, this paper has shown the differences between the GVC participation rate of countries such as Mexico and Costa Rica, and more southern countries, like Argentina, Brazil and Chile. This paper has investigated the manufacturing industry specifically at the automotive industry in Mexico and Brazil. Future studies might like to consider the Rules of Origin and NTM for the Latin American region. Lastly, this paper aimed to look at the relation between RTAs and GVCs, the case analyzed by Miroudot, Rouzet and Spinelli by measuring the direction and intensity of a country's network relations to the measure of RTAs. The case confirmed that Mexico showed high correlation coefficients between RTAs and GVC. It concluded that RTAs falls short of covering all trade partners in the supply chain trade. Since there are so many RTAs within Latin America, it would be meaningful to analyze the network index and RTA index for Latin American countries only.

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국 문 초 록

라틴아메리카의 글로벌 가치사슬 분석 : 무역협정의 역할과 자동차산업 분석을 중심으로

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과연 자유무역협정은 글로벌 가치사슬(Global Value Chain)을 촉진하는가? 그렇다면 수많은 지역무역협정에도 불구하고 왜 중남미 국가들의 글로벌 가치사슬 참여도는 높지가 않은 것인가? 지역 내 글로벌 가치사슬 참여도가 낮은 결정요인은 무엇이고, 이러한 구조를 개선하려면 어떤 변화가 필요한가?

글로벌 가치사슬은 현대 경제에서 구조적 변화를 일으키는 구심점 역할을 하였으며, 긍정적인 혹은 부정적인 두 면의 결과를 야기했다. 글로벌 가치사슬의 여러 부문에 참여하는 것은 참가국들에게 지대한 영향을 미친다. 중남미 국가들은 글로벌 가치사슬에 각자 다양(heterogeneous)한 참여를 하며 부가가치를 생성하고 있지만, 저(低)부가가치 분야 중심의 가치사슬 참여는 중남미 국가들의 공통된 '고민'이다.

본 논문은 OECD/WTO 의 부가가치 기준 무역 (Trade in Value Added : TiVA) 통계를 토대로, 1995 년부터 2011 년까지 총 17 년간 중남미의 낮은 글로벌 가치사슬 참여도에 대한 분석 및 평가를 실시한다. 먼저, 중남미의 글로벌 가치사슬에 관한 기존 연구를 토대로 중남미 지역의 가치사슬 구조를 분석한다. 다음으로, 중남미의 주요 7 개 국가(아르헨티나, 브라질, 칠레, 콜롬비아, 코스타리카, 멕시코, 페루)의 수출 중 부가가치 부문 및 글로벌 가치사슬 참여도를 연구한다. 또한, 본 논문은 사례 연구로 중남미의 제조업 부문 글로벌 가치사슬을 탐구한다. 특히, 자동차 산업의 TiVA 통계를 분석하여, 중남미 국가의 고(高)부가가치 창출 실패의 요인으로 글로벌 선두

기업의 부재를 지적하는 한편, 자유무역협정이 중남미 지역 내 글로벌 가치사슬 활성화에 도움을 줄 수 있음을 주장한다.

주제어: 글로벌 가치사슬 (GVC), 국제무역, 글로벌 생산 네트워크, 부가가치 무역, 중남미, 제조업

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